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Short Report

Distance from practice moderates the relationship between patient management involving nurse telephone triage consulting and patient satisfaction with care

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ABSTRACT

The ESTEEM trial was a randomised-controlled trial of telephone triage consultations in general practice. We conducted exploratory analyses on data from 9154 patients from 42 UK general practices who returned a questionnaire containing self-reported ratings of satisfaction with care following a request for a same-day consultation. Mode of care was identified through case notes review. There were seven main types: a GP face-to-face consultation, GP or nurse telephone triage consultation with no subsequent same day care, or a GP or nurse telephone triage consultation with a subsequent face-to-face consultation with a GP or a nurse. We investigated the contribution of mode of care to patient satisfaction and distance between the patient's home and the practice as a potential moderating factor. There was no overall association between patient satisfaction and distance from practice. However, patients managed by a nurse telephone consultation showed lowest levels of satisfaction, and satisfaction for this group of patients increased the further they lived from the practice. There was no association between any of the other modes of management and distance from practice.

1. Purpose

Despite the growing popularity of telephone consultations for managing patient care there is a paucity of evidence around its acceptability to patients. Research has found that telephone consultations, whether delivered by either a doctor or a nurse, are generally acceptable to patients Bunn et al., 2004; McKinstry et al., 2009, but methodological limitations have made it difficult to have confidence in these findings. Our robust trial of telephone triage in general practice (ESTEEM; Campbell et al., 2014) compared a GP and a nurse telephone triage system with usual care. No significant differences in overall patient satisfaction were found between GP triage and usual care; however, nurse triage was marginally less acceptable to patients.

This report presents additional analysis of patient satisfaction data from ESTEEM. We examined whether the mode of same-day management involving telephone consulting – a telephone consultation alone or a telephone consultation plus additional face-to-face support on the day, delivered by a doctor or nurse – influenced satisfaction ratings. We documented if distance from practice influenced satisfaction scores, or interacted with the management method. McKinstry et al. (2009) implied that patient satisfaction with telephone consulting may increase for patients living more remotely from the practice as it can reduce the necessity of practice visits. In this exploratory analysis we sought to test the hypothesis that there would be a positive association between satisfaction with same-day care and distance from practice for patients managed by a GP telephone consultation alone or a nurse telephone consultation alone.

2. Methods

2.1. Study design and data collection

ESTEEM (Campbell et al., 2013, 2014, 2015) was a cluster-randomised controlled trial whereby 42 UK general were recruited and randomly assigned (1:1:1) with minimisation on geographical location, practice deprivation (Public Health England, 2013), and

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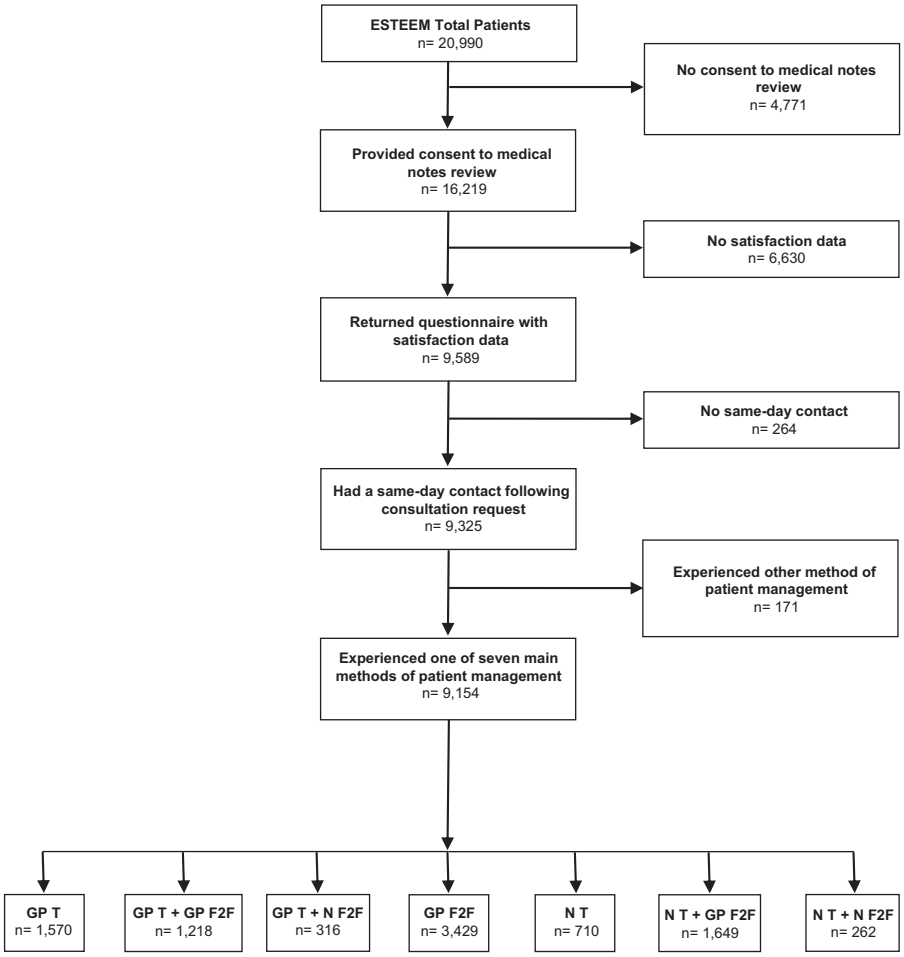

Fig. 1. Flow chart of participants included in the exploratory analysis. Key: GP=General Practitioner; N=Nurse; T=Telephone consultation; F2F=face-to-face consultation.

practice list size, to either GP-led triage, nurse-led triage, or usual care. 20,990 patients requesting a same-day face-to-face consultation with a GP at their practice were recruited; patients were sent a questionnaire to record their satisfaction with care. Patient's mode of care was determined from review of their medical record. Patient demographic data including patient age, gender and residential postcode (to calculate deprivation status) were extracted from general practice computer systems.

2.2. Participants

9154 patients were included in analyses. These were patients who i) provided consent to medical notes review, ii) received care on the same day as their request, iii) returned a questionnaire reporting satisfaction with care, and iv) followed one of seven predefined management pathways (Fig. 1).

2.3. Measures

2.3.1. Patient management

There were seven common patient management pathways: a GP face-to-face consultation alone, a GP or nurse telephone consultation alone, or a GP or nurse telephone consultation followed by a same-day GP or nurse face-to-face consultation. Less common pathways were those accounting for less than 1% of patient interactions across the whole trial.

2.3.2. Distance from practice

42 practice and 9106 patient postcodes (48 postcodes missing) were mapped using the ONS Postcode Directory (August 2013). A road network was derived from the OS Meridian 2 dataset (Ordnance Survey, 2013). Travel distance (km) from patient to practice postcode was calculated based on the shortest distance route via road, using ArcGIS Network Analyst 10.1 (ESRI, Redlands).

2.3.3. Socio-demographics

Age was categorised: 0–4 years; 5–11 years (12–15 year olds were ineligible for the trial; Campbell et al., 2014); 16–24 years; 25–59 years; 60–74 years; 75 years and older. Patients' deprivation status was based on the IMD 2010 score (UK Government, 2011) and divided into quintiles based on rank.

2.3.4. Patient satisfaction

A single questionnaire item modified from the English GP patient survey (NHS England, 2014), "overall how satisfied or dissatisfied were you with the care received on that day?" rated on a 5-point Likert scale: "very satisfied", "fairly satisfied", "neither satisfied nor dissatisfied", "fairly satisfied" or "very dissatisfied".

2.4. Statistical methods

All analyses took the form of hierarchical models with a random effect on practice. To account for potential confounding we adjusted all models using minimisation variables along with patient gender, age, and deprivation (effects not reported). Patient

Table 1
Patient demographic information for each mode of patient management.

	Mode of patient management						
	GP face-to-face (*N*=3429)	**GP telephone (*N*=1570)**	**Nurse telephone (*N*=710)**	**GP telephone and GP face-to-face (*N*=1218)**	**GP telephone and nurse face-to-face (*N*=316)**	**Nurse telephone and GP face-to-face (*N*=1649)**	**Nurse telephone and nurse face-to-face (*N*=262)**
Site: *n* (%)							
Devon	888 (26)	283 (18)	174 (25)	405 (33)	36 (11)	597 (36)	73 (28)
Bristol/Somerset	634 (18)	534 (34)	273 (38)	456 (37)	51 (16)	298 (18)	91 (35)
Warwick/ Coventry	706 (21)	363 (23)	184 (26)	167 (14)	14 (4)	485 (29)	29 (11)
Norfolk/Suffolk	1201 (35)	390 (25)	79 (11)	190 (16)	215 (68)	269 (16)	69 (26)
Practice list size: *n* (%)							
Large	1878 (55)	967 (62)	525 (74)	730 (60)	286 (91)	1128 (68)	201 (77)
Medium	1357 (40)	538 (34)	126 (18)	424 (35)	28 (9)	383 (23)	22 (8)
Small	194 (6)	65 (4)	59 (8)	64 (5)	2 (1)	138 (8)	39 (15)
Practice deprivation[a] *n* (%)							
Not deprived	2483 (72)	1245 (79)	627 (88)	1065 (87)	291 (92)	1443 (88)	225 (86)
Deprived	946 (28)	325 (21)	83 (12)	153 (13)	25 (8)	206 (12)	37 (14)
Age (years): Mean (SD)	48.08 (24.36)	53.11 (22.94)	49.29 (25.24)	48.33 (26.24)	51.08 (26.50)	49.12 (25.42)	44.00 (27.52)
Age group (years): *n* (%)							
0–4	300 (9)	76 (5)	67 (9)	128 (11)	28 (9)	157 (10)	36 (14)
5–11	180 (5)	61 (4)	36 (5)	76 (6)	22 (7)	97 (6)	19 (7)
16–24	217 (6)	68 (4)	37 (5)	65 (5)	16 (5)	83 (5)	24 (9)
25–59	1398 (41)	655 (42)	287 (40)	432 (35)	92 (29)	609 (37)	90 (34)
60–74	924 (27)	423 (27)	163 (23)	328 (27)	96 (30)	467 (28)	58 (22)
75 plus	410 (12)	287 (18)	120 (17)	189 (16)	62 (20)	236 (14)	35 (13)
Gender: *n* (%)							
Female	2068 (60)	969 (62)	443 (62)	697 (57)	181 (57)	974 (59)	165 (63)
Male	1361 (40)	601 (38)	267 (38)	521 (43)	135 (43)	675 (41)	97 (37)
Patient deprivation[a, b]: *n*, Mean (SD)	3402, 16.65 (10.03)	1567, 17.18 (12.11)	706, 14.61 (9.75)	1216, 15.13 (9.05)	316, 15.32 (6.94)	1635, 16.34 (9.79)	261, 16.15 (10.16)
Patient deprivation[b]: *n* (%)							
Quintile 1 (least)	674 (20)	328 (21)	207 (29)	229 (19)	44 (14)	351 (21)	58 (22)
Quintile 2	1014 (30)	425 (27)	201 (28)	410 (34)	92 (29)	457 (28)	85 (33)
Quintile 3	894 (26)	448 (29)	167 (24)	368 (30)	129 (41)	406 (25)	47 (18)
Quintile 4	622 (18)	239 (15)	95 (13)	166 (14)	44 (14)	346 (21)	50 (16)
Quintile 5 (most)	198 (6)	127 (8)	36 (5)	43 (4)	7 (2)	75 (5)	21 (8)
Overall satisfaction[c] (0–100)							
n, Mean (SD)	3429, 89.29 (18.57)	1570, 87.74 (20.59)	710, 84.01 (23.86)	1218, 90.33 (17.86)	316, 88.61 (19.94)	1649, 87.25 (20.54)	262, 88.93 (19.12)
Distance from practice (km)							
n, Mean (SD)	3402, 4.07 (5.49)	1567, 3.14 (3.06)	709, 2.85 (2.39)	1216, 3.09 (2.99)	316, 3.95 (3.22)	1635, 2.80 (2.55)	261, 2.61 (2.66)
Inter-quartile range:							
25	0.86	0.88	1.14	0.86	1.52	0.96	1.01
50	1.89	2.05	2.13	1.97	2.69	1.89	1.77
75	5.11	4.29	3.89	4.56	5.88	3.95	3.58

[a] Practice deprivation derived from Public Health England, National General Practice Profiles: http://fingertips.phe.org.uk/profile/general-practice.
[b] IMD 2010 score and rank derived from residential postcode data mapped to lower super output area (LSOA); https://www.gov.uk/government/publications/english-indices-of-deprivation-2010—higher scores indicate greater deprivation.
[c] Higher scores indicate increasing satisfaction. Percentages may not sum to 100 due to rounding.

satisfaction was reverse scored and linearised on a scale of 0–100 to facilitate interpretation (Lyratzopoulos et al., 2012) (higher values indicating increasing satisfaction). Two linear hierarchical models were fitted, Model A included method of patient management (with GP face-to-face consultations as the reference category) and distance from practice. Model B was based on Model A with the inclusion of a global interaction term between patient management and distance from practice. Distance was expressed in units where 1 unit represented 10 km. A p-value of ≤ 0.05 was deemed statistically significant. Given our hypothesis that distance might be associated with satisfaction for patients managed by (a nurse or a GP) telephone consultation alone we tested for simple interaction effects. We used marginal mean scores to demonstrate the interaction effect between distance from practice and mode of management, deriving the mean difference in score for each mode of management observed when increasing distance from practice

by 10 km, while assuming that all other patient/practice covariates included within the model remained constant. All analyses were conducted using Stata MP 12.1.

3. Results

Patient characteristics are presented in Table 1. Models testing main and interaction effects are summarised in Table 2. Method of patient management predicted satisfaction for two of the six management options. Compared with GP face-to-face consultations, patients who received a nurse telephone consultation alone, or who received a nurse telephone consultation with a subsequent GP face-to-face consultation were less satisfied. There were no differences in patient satisfaction between those who received a GP face-to-face consultation and those in the other four management pathways. Distance from practice was not independently associated with patient satisfaction and there was no significant global interaction between management method and distance from practice. However, an interaction effect showed that satisfaction for those managed by a nurse telephone consultation alone increased by 7.2 points for every 10 km they lived further from the practice (95% CI: 0.84; 13.54). Marginal means depicting this interaction are presented in Fig. 2.

4. Discussion

Mode of management involving telephone consulting by a GP or by a nurse was not more satisfactory to patients than management by GP face-to-face consultation. In general, patient management involving telephone consulting was less satisfactory when delivered by a nurse, reflecting the ESTEEM trial findings (Campbell et al., 2014). Distance from practice was not associated with satisfaction. However, with an increase in satisfaction of 7.2 points for every 10 km from the practice, there was some evidence of a positive relationship between distance from practice and satisfaction for patients managed by nurse telephone consultations alone. This finding provides partial support for McKinstry et al.'s (2009) implied link between satisfaction and distance when telephone consulting precludes a practice visit. Our findings are novel and highlight the combined importance of method of management and distance from practice on patient satisfaction with same-day care.

Although we did not have data on the circumstances of each individual in the study, it seems possible that the absence of an observed association between distance from practice and satisfaction might be due to the personal circumstances of the patient and the perception of whether a trip to the practice or a phone call alone (from any clinician) is viewed as favourable irrespective of the distance the individual is living from the practice. For example, a patient living in proximity to the practice may have a disability and find it difficult to attend a face-to-face consultation and thus value the opportunity of a telephone consultation.

There were some limitations to our work. First, the ESTEEM trial was not powered to detect interactions involving patient satisfaction. Second, our work was conducted in GP practices with restricted catchment areas; there were large concentrations (75%) of people living within a 5 km distance from their practice. Any effect of distance is likely to have been attenuated. Finally, patient satisfaction was high for each management method, especially for methods involving GPs, raising the possibility of ceiling effects limiting the interpretability of the findings. In this context, the observed interaction between satisfaction, mode of care, and distance from the practice for patients receiving nurse telephone care may not be entirely surprising given that overall satisfaction varied most in patients receiving this mode of care. This restriction in variance may account for the lack of observed interaction effects involving GP management methods.

With an increase in the popularity of nurse telephone consulting (Bunn et al., 2004; De Coster et al., 2010; St George et al., 2008), there is a need to better understand patient experience within these systems. Our findings suggest that nurse telephone consulting may

Table 2
Differences in reported overall satisfaction with care on day of request for a same-day GP consultation based on mode of patient management and road distance from practice: multilevel models examining (a) main and (b) interaction effects[a].

Variables	(a) Multilevel model: main effects (*N* practices=42; *N* patients=9103) Overall difference[b]			(b) Multilevel model: main effects+interaction effects (*N* practices=42; *N* patients=9103) Overall difference[b]		
	Difference	**(95% CI)**	***p*-Value[c]**	**Difference**	**(95% CI)**	***p*-Value[c]**
Mode of management			<0.0001			<0.0001
GP face-to-face	Reference			Reference		
GP telephone	−1.22	(−2.87; 0.44)		−1.61	(−3.66; 0.43)	
Nurse telephone	−5.37	(−7.39; −3.35)		−7.46	(−10.18; −4.74)	
GP telephone+GP face-to-face	1.02	(−0.74; 2.79)		1.29	(−0.92; 3.49)	
GP telephone+nurse face-to-face	−0.09	(−2.78; 2.59)		−1.62	(−5.43; 2.19)	
Nurse telephone+GP face-to-face	−2.31	(−3.99; −0.63)		−3.04	(−5.12; −0.97)	
Nurse telephone+nurse face-to-face	−1.06	(−3.91; 1.78)		0.41	(−3.32; 4.14)	
Road distance from practice (per 10 km)	1.06	(−0.26; 2.38)	0.12	0.43	(−1.31; 2.18)	0.63
Mode of management (GP face-to-face as reference) × Distance (per 10 km) from practice						0.14
GP telephone × Distance from practice	N/A			1.11	(−2.62; 4.85)	
Nurse telephone × Distance from practice	N/A			7.19	(0.84; 13.54)	
GP telephone+GP face-to-face × Distance from practice	N/A			−1.10	(−5.27; 3.07)	
GP telephone+nurse face-to-face × Distance from practice	N/A			3.90	(−3.16; 10.95)	
Nurse telephone+GP face-to-face × Distance from practice	N/A			2.52	(−1.66; 6.70)	
Nurse telephone+nurse face-to-face × Distance from practice	N/A			−5.86	(−15.00; 3.28)	
Constant	87.30	(85.11; 89.49)	<0.0001	87.51	(85.31; 89.70)	<0.0001

[a] Model adjusted for patient (gender, deprivation level, age) and practice (list size, site, deprivation level) covariates (results not shown).
[b] Positive difference indicates increased satisfaction and negative difference indicates reduced satisfaction.
[c] The *p*-value for categorical covariates refers to the global effect of covariate across all categories vs. the reference category and for interaction terms, the global effect of the interaction between distance and individual patient management category.

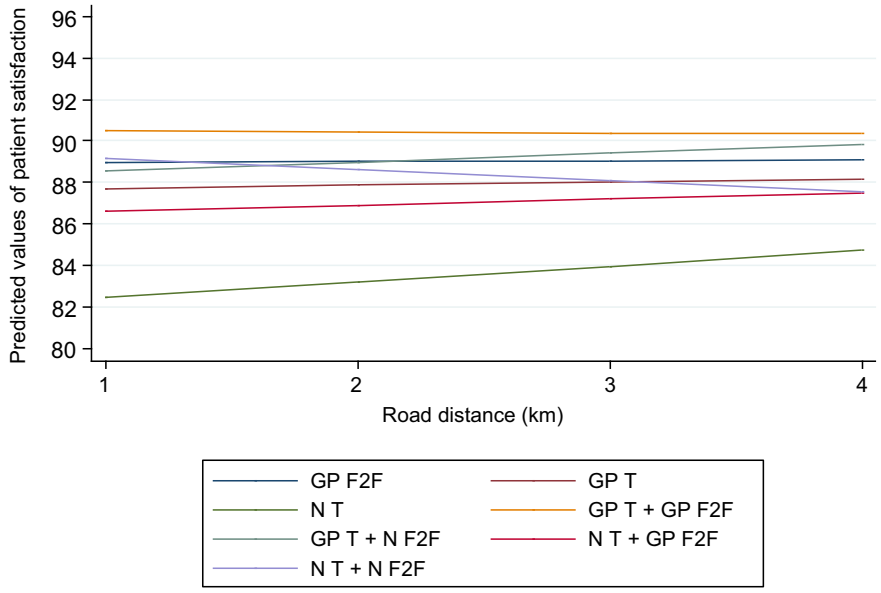

Fig. 2. Average marginal effect on overall patient satisfaction by the patient management method. Note: GP: General Practitioner; N: Nurse; T: Telephone consultation; F2F=face-to-face consultation.

not improve patient satisfaction beyond the conventional GP face-to-face consultation except when it precludes a visit to the service provider for patients living further from the practice.

Contributors

RC developed the research question, conducted analysis and wrote the first draft of the article. FW and JC supported development of the research question and analysis. BW performed mapping and GIS analysis. All authors contributed to the interpretation of results and drafting of the final article, including critique for important intellectual content.

Declaration of interest

We declare that we have no competing interests.

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Disclaimer

The views and opinions expressed herein are those of the authors and do not necessarily reflect those of the Health Technology Assessment programme, the National Institute for Health Research, the National Health Service, or the Department of Health.

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